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21-23 June 2005, at US Military Academy, West Point, NY

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Original title on 712 A/B:__**Simulation Modeling of the AETC Flying Training**_____

Revised title:_____**AETC Flying Training Capacity Model**_____

Presented in (input and Bold one): (**WG_22__,** CG___, Special Session ___, Poster, Demo, or Tutorial):

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Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
21 JUN 2005	**N/A**	**-**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Flying Trainig Capacity Model Initial Results	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **AETC SAS 151 J Street East, Suite 2 Randolph AFB, TX 78150**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release, distribution unlimited

13. SUPPLEMENTARY NOTES
See also ADM201946, Military Operations Research Society Symposium (73rd) Held in West Point, NY on 21-23 June 2005. , The original document contains color images.

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			
unclassified	**unclassified**	**unclassified**	**UU**	**15**	

Standard Form 298 (Rev. 8-98)
Prescribed by ANSI Std Z39-18

Air Education and Training Command

Sustaining the Combat Capability of America's Air Force

U.S. AIR FORCE

FLYING TRAINING CAPACITY MODEL

Initial Results

MORSS 2005

Capt Susan Lynch

21-23 Jun 05

AETC Studies & Analysis Squadron

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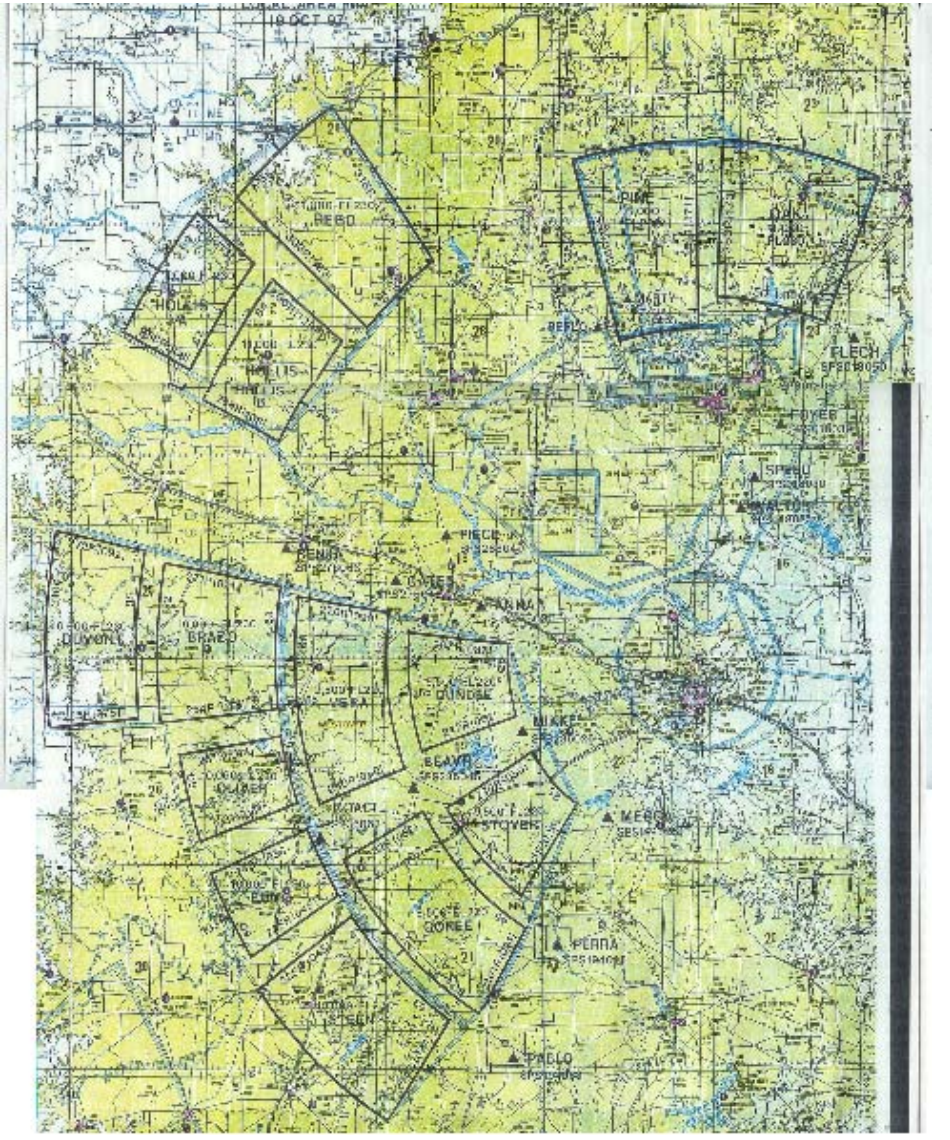
Overview

- Objective
- Background
- FAA Model
- Capacity Metrics
- SAS Model
- Initial Results
- Conclusions
- Way Ahead



Objective

- **Determine the flying training capacity for 6 bases:**
  - **Sheppard AFB**
  - **Randolph AFB**
  - **Moody AFB**
  - **Columbus AFB**
  - **Laughlin AFB**
  - **Vance AFB**

- **Develop versatile flying training capacity simulation model for AETC**
- **Reconcile metrics between FAA model and AETC operational models**

Background

- FAA Circular 150/5060-5: Airport Capacity and Delay dated 9-23-83 (with changes 1 & 2) only readily available model used to calculated airfield operational capacity
- HQ AETC/DO generates flying training capacity via Flying Training Resources Analysis and Programming (FTRAP) model
- Jan 05 – AETC/XP tasked SAS to generate flying training capacity
- Jun 05 - AETC SAS briefed AETC/XP on model results
- Currently - Model results being validated with HQ AETC/DOR and flying training bases

FAA Model

- FAA Circular 150/5060-5: Airport Capacity and Delay, dated Sep 83
  - No soft copies of circular exist
  - FAA has not been updating circular
- FAA uses two models to estimate airport capacities
  - SIMMOD
  - TAAMS (Total Airspace & Airport Modeler) by Boeing
- Differences between FAA circular/models and AETC flying operations
  - FAA Advisory Circular: Airport Capacity & Delay BBP, dated 14 Feb 05
    - Circular does not take circular pattern of small trainer aircraft into consideration
    - Circular does not concentrate on training launch intervals—primary limiting factor in AF operations
  - FAA and AETC models use different capacity metrics

FTRAP Model

- **FTRAP model is proven**
  - **Currently used by HQ AETC to program flying training students**
  - **Based on previous simulation model**
  - **Provides maximum sustainable student capacity numbers by base**
- **FTRAP model is not versatile**
  - **Excel spreadsheets based on corporate knowledge**
  - **Requires flying training subject matter expert (SME) inputs**

Capacity Metrics

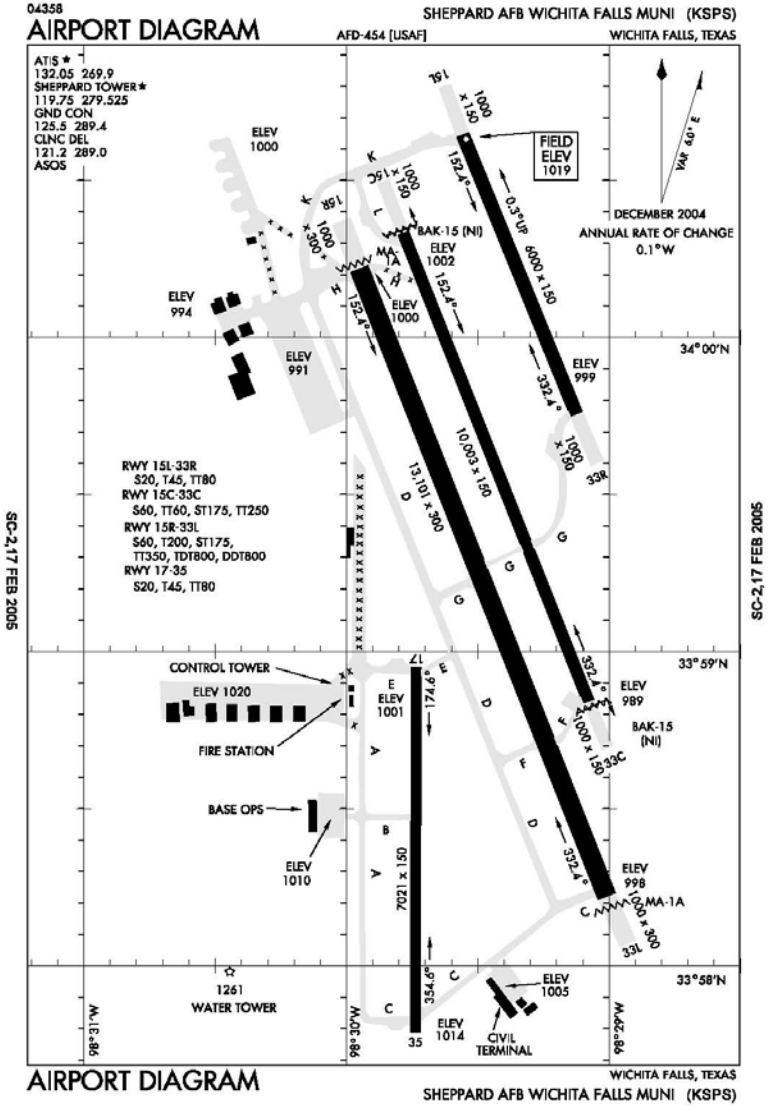
- **FAA Capacity Metrics – Runway Operations**
  - Based on runway operations – landing and take-offs
  - Consider maximum runway IFR & VFR operations
  - Capacity given in terms of runway operations per year
- **AETC Capacity Metrics - Graduates**
  - Based on sortie generation
  - Consider traffic in training patterns required to complete sorties
  - Capacity given in terms of UPT graduates per year
- **Translating AETC capacity metrics into FAA capacity metrics**
  - Compared FAA operations / hour and AETC operations / graduate
  - Calculated runway operations / year from actual graduates

SAS Model

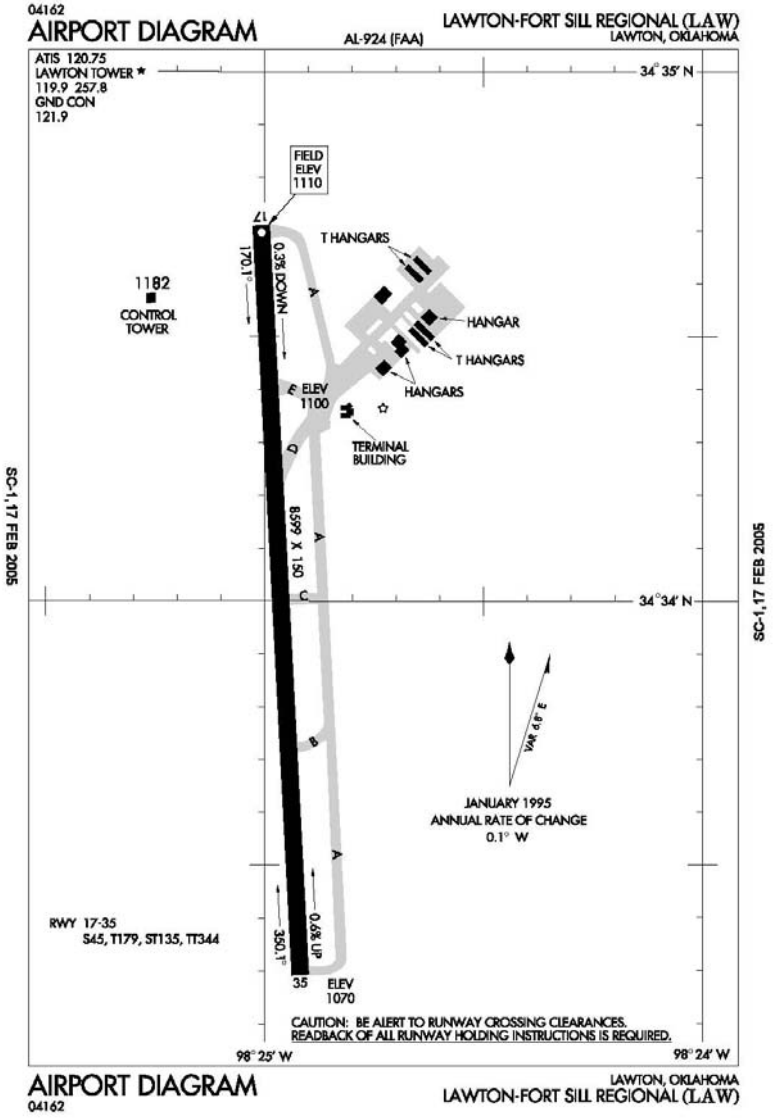
- Data and assumptions from FTRAP model & bases
  - Weather data by base
  - Maintenance records and interviews by base
  - Daylight hours modeled based on historical data—most student sorties occur during day
- Sorties built from flying training syllabus in coordination with Instructor Pilots (IPs) from each course
- Airspace capacities from base operations SMEs
  - Runway capacities
  - Military Operating Area capacities (including aux fields)
  - Training route capacities
- Resources are variable by base
  - Number of aircraft
  - Daily student load
  - Student arrivals
  - Flying schedules

SAS Model

Sheppard AFB



Lawton Air Field



SAS Model

- **Courses modeled (in Arena application)**

Sheppard AFB		Columbus AFB		Laughlin AFB		Vance AFB		Moody AFB		Randolph AFB	
Course	# Sorties	Course	# Sorties	Course	# Sorties	Course	# Sorties	Course	# Sorties	Course	# Sorties
ENJJPT T37	93	T1	57	T1	57	T1	57	T6	65	T1 PIR	22
ENJJPT T37 PIT	71	T37 ALP	126	T6	65	T37	68	IFF	24	T1 PIT	44
ENJJPT T38	100	T37	68	T38A	100	T38C	98			T6 PIT	44
ENJJPT T38 PIT	71	T38C	98	T38C	98					T6 IPT	29
ENJJPT IFF	34									T37 PIR	27
ENJJPT IFF PIT	29									T37 PIT	50
										T38C PIR	29
										T38C PIT	71
398		349		320		223		89		316	

Total Sorties Modeled	1695

ENJJPT – Euro NATO Joint Jet Pilot Training

T37 – Primary Trainer

PIT – Pilot Instructor Training

T38 – Fighter/Bomber Trainer

IFF – Introduction to Fighter Fundamentals

T1 – Heavy Trainer

ALP – Aviation Leadership Program

IPT – Instructor Pilot Transition

PIR – Pilot Instructor Requalification

Columbus Initial Results

Graduates Metric

FY04 Graduates	Primary T-37	T-37 ALP	T38	T1
Actuals	344	19	126	227
FTRAP Projection	383	36	125	230
SAS Model Projection	366	33	139	206

Maximum Capacity	T-37 Primary / ALP	T38	T1
FTRAP Estimate	428	147	219
SAS Model Projection	454	182	225

FY04 Operating Cap	T-37 Primary / ALP	T38	T1
FTRAP Estimate	98%	85%	105%
SAS Model Projection	88%	76%	92%

SAS Model validated within variance of FY04 actuals & FTRAP estimates

Columbus Initial Results

Runway Operations Metric

FY04 Graduates	Primary T-37	T-37 ALP	T38	T1
Actuals	213000	16000	99000	132000
SAS Model Projection	227000	22000	109000	119000

Maximum Capacity	T-37 Primary / ALP	T38	T1
FTRAP Estimate	265000	115000	127000
SAS Model Projection	281000	142000	130000
FAA Estimate	461000	426000	275000

FY04 Operating Cap	T-37 Primary / ALP	T38	T1
FTRAP Estimate	98%	85%	105%
SAS Model Projection	89%	77%	92%
FAA Model Estimates	56%	23%	48%

FAA Model overestimates current capacity at Columbus AFB

Conclusions

- **Accurately determined the flying training capacity**
  - **SAS model validated with FY04 actual grads and FTRAP historical programming estimates for all 6 bases**
  - **Predicts future graduate capacity within 4% of actual operational capacity**
- **Developed versatile flying training capacity simulation model for AETC**
  - **Projects bases ability to accept additional flying training missions**
  - **Projects maximum student capacity based on current weather, maintenance, aircraft and airspace availability**
- **Reconciled metrics between FAA model and AETC operational models**
  - **Translated student graduates into operations per hour**
  - **Showed the FAA model overestimates current capacity at all AETC flying training bases**

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